NUMBER 21

Proceedings

of

The Canadian Phytopathological Society

Twentieth Session

June 22-25, 1953

SASKATOON

SASK.

Issued November 1, 1953.

Editorial Committee

RUTH M. HORNER
R. S. WILLISON
R. D. TINLINE
A. J. SKOLKO

89

COMMONWEALTH MYCOLOGICAL INSTITUTE
26 NOV 1953

NUMBER 21

Proceedings

of

The Canadian Phytopathological Society

Twentieth Session

June 22-25, 1953

SASKATOON

SASK.

Editorial Committee

RUTH M. HORNER
R. S. WILLISON
R. D. TINLINE
A. J. SKOLKO

39

The Canadian Phytopathological Society

LIST OF OFFICERS AND COUNCIL
1952-53

President

J. C. PERRAULT, Plant Pathology Laboratory, Ste. Anne de la Pocatiere, Que.

Vice-President

P. M. SIMMONDS, Plant Pathology Laboratory, Saskatoon, Sask.

Secretary-Treasurer

A. J. SKOLKO, Botany and Plant Pathology Division, Science Service, Ottawa, Ont.

Councillors

W. R. FOSTER, Provincial Plant Pathology Laboratory, Victoria, B.C.
G. H. BERKELEY, Plant Pathology Laboratory, St. Catharines, Ont.

Copies of the Proceedings of the Canadian Phytopathological Society may be obtained from the Secretary-Treasurer at a price of 50c each.

Front Row : L. to R. — H. R. McLarty, A. W. Henry, W. F. Hanna, P. M. Simmonds, C. Perrault, A. J. Skolko, T. Johnson, F. J. Greaney, T. C. Vanterpool.
Second Row : W. D. Touzeau, R. N. Wensley, H. W. Mead, B. Peturson, W. E. Sackston, W. M. Cormack, A. H. D. Henderson, F. R. Harper, R. E. Fitzpatrick, J. A. Parmelee, W. P. Campbell
Third Row : S. B. Hrushovetz, R. C. Russell, D. B. Robinson, S. H. F. Chinn, E. J. Hawn, R. J. Ledingham, B. J. Sallans, H. A. H. Wallace.
Back Row : D. J. Petty, G. C. Chamberlain, C. G. Riley, R. A. Ludwig, W. C. Broadfoot, J. T. Slykhuis, D. T. Wang, W. P. Skoropad, R. D. Tinline, W. R. Orchard.

Annual Meeting, C.P.S., Saskatoon, Sask., June 22-25, 1953.

MINUTES OF THE TWENTIETH MEETING HELD AT SASKATOON, SASKATCHEWAN, JUNE 22 TO 25, 1953.

Business Sessions: June 23 and June 25

The first business session of the 20th meeting was convened in the Physics Building, University of Saskatchewan, and was opened by the President with a few words of welcome to the members. Dr. Perrault reviewed the year's activities, mentioning the increased membership, a new high in the Society's history, our sound financial position, and the activities of the regional groups during the past year. Reference was made to the retirement of Dr. J. H. Craigie and congratulations were extended to his successor, Dr. W. F. Hanna, as Chief of the Division of Botany and Plant Pathology. The absence of Dr. Wm. Newton, who was appointed to duties with F.A.O. in Ceylon, was noted.

The minutes of the 19th meeting, published in last year's proceedings were adopted on motion of R. A. Ludwig, seconded by B. Peturson, without reading.

The president reviewed several matters arising from the minutes and referred them to various committee reports to be heard later.

The election of the Nominating Committee returned the following: J. C. Perrault (retiring president, as chairman), G. H. Berkeley (past president), H. R. McLarty, A. W. Henry, and D. J. MacLeod.

By unanimous vote of the meeting the following applications for membership were accepted: Bernard Boivin, R. L. Beacroft, A. T. Bolton, Stanley H. F. Chinn, H. Katznelson, David Leblond, J. H. McLeod, O. T. Page, Jacquelin Santerre, Wm. P. Skoropad, G. V. Van Tausk, Dalton Wang, Luella Weresub.

The report of the Secretary-Treasurer was read and adopted on motion of A. J. Skolko and R. C. Russell.

The report of the Custodian of Records and Library was read by T. Johnson and adopted on his motion, seconded by W. F. Hanna. Considerable discussion followed on the advisability of maintaining a library by the society because of the discontinuous manner in which journal series were received and the lack of means to properly index and circulate a list of publications received. C. G. Riley moved that all publications in the C.P.S. library be donated to some library where they could be properly processed and used. This motion, seconded by R. A. Ludwig, was amended in order that some thought could be given to the disposition of the C.P.S. library, on motion of W. F. Hanna (seconded by T. C. Vanterpool) instructing the custodian to prepare his recommendations on this matter for the next annual meeting. The amendement carried.

The report of the Editorial Committee was adopted on motion of A. J. Skolko and W. E. Sackston.

The slate of officers presented by the Nominating Committee was elected by acclamation.

The report of the Terminology Committee was adopted on motion of A. W. Henry and E. J. Hawn.

The report of the Disease Diagnosis Committee was adopted on motion of H. W. Mead and W. E. Sackston. Some discussion on the advisability of continuing the work of the committee resulted in its retention for another year on motion of A. W. Henry and R. E. Fitzpatrick. Discussion of the collection of kodachrome slides on phytopathological subjects brought forth a number of suggestions. R. A. Ludwig thought that a set of slides dealing with specific diseases could be offered for sale. W. F. Hanna suggested that the Bio-Graphic Unit, Science Service, might be prepared

to establish a collection of slides and indicated the danger involved in making loans. T. C. Vanterpool favoured a central copying agency.

T. Johnson announced that no report was available from the Nomenclature Committee.

The report of the Publications Committee was adopted on motion of W. F. Hanna, seconded by W. C. Broadfoot. Dr. Hanna suggested that this committee be dissolved but Dr. Perrault felt that the committee should be retained and investigate the desirability and feasibility of establishing a society journal. Dr. Johnson suggested that the present journals for phytopathological papers were adequate. Other suggestions included the possibility of having the Canadian Journal of Botany renamed the Canadian Journal of Botany and Plant Pathology, full publication of papers instead of abstracts in the proceedings of the society and the publication of a monograph series by the society. These suggestions were referred to the Publications Committee for consideration.

The report of the Representative to the Canadian Society of Microbiologists was adopted on motion of A. J. Skolko and W. P. Campbell. Unanimous approval was given a motion by H. R. McLarty and P. M. Simmonds to have Prof. A. R. Walker continue as Representative to C. S. M. and to express our appreciation for the co-operation we have received from the Canadian Society of Microbiologists.

Under the heading of new business, R. A. Ludwig and T. C. Vanterpool moved that an honorarium of $25.00 be granted to Dr. Henry's secretary for secretarial assistance in connection with the activities of the Terminology Committee. Carried.

Dr. A. W. Henry noted that the society had a representative to the last International Botanical Congress in Stockholm who was instrumental in the establishment of a committee on terminology. He felt that definite representation should be provided at the forthcoming international congress. On motion of P. M. Simmonds and H. R. McLarty, Dr. Henry was authorized to make the necessary arrangements for representation to the committee on terminology of the International Botanical Congress.

B. J. Sallans and M. W. Cormack moved that the society request the publication of Dr. B. W. Currie's address, "The Ups and Downs of Weather on the Prairies," in the Agricultural Review. Carried.

The report of the Resolutions Committee was unanimously adopted on motion of R. C. Russell and T. Johnson.

Dr. Perrault expressed his appreciation for the co-operation he had received from the Council and members during his term as president and congratulated the president-elect as he turned the meeting over to Dr. Simmonds.

The new president announced the appointment of committees and regional representatives, as follows, and the meeting then adjourned.

COMMITTEES

Nominating (by election): J. C. Perrault (retiring president as chairman), G. H. Berkeley (past president), H. R. McLarty, A. W. Henry, D. J. MacLeod.

Program and Publicity: J. G. Coulson (chairman), J. E. Jacques, O. A. Olsen, L. Cinq-Mars, A. J. Skolko.

Resolutions: J. F. Hockey (chairman), H. N. Racicot, A. A. Hildebrand.

Editorial: Ruth Horner (chairman), R. S. Willison, R. D. Tinline, A. J. Skolko.

Terminology: A. W. Henry (chairman), D. C. Buckland, W. A. F. Hagborg, B. H. MacNeill, H. M. Good, T. C. Vanterpool, R. S. Willison, R. A. Ludwig, W. E. McKeen, C. D. McKeen, D. J. MacLeod, R. Pomerleau, L. E. Tyner, M. F. Welsh, A. N. Langford.

Nomenclature: J. W. Groves (chairman), J. J. Miller, W. L. Gordon, I. L. Conners.

Disease Diagnosis: H. W. Mead (chairman), W. E. Sackston, G. B. Sanford, G. C. Chamberlain, D. J. MacLeod, Frances C. Mellor, W. A. Benedict.

Custodian of Library and Records: T. Johnson.

Auditors: Mildred K. Nobles and J. W. Groves.

Representative to the Canadian Society of Microbiologists: A. R. Walker.

Publications: W. F. Hanna (chairman), F. L. Drayton, G. H. Berkeley.

Regional Representatives:

L. C. Callbeck	—	Maritimes
R. Pomerleau	—	Eastern Quebec
L. Cinq-Mars	—	Western Quebec
R. J. Baylis	—	Eastern Ontario
J. J. Miller	—	Western Ontario
W. A. F. Hagborg	—	Manitoba
T. C. Vanterpool	—	Saskatchewan
A. W. Henry	—	Alberta
B. M. Lawson	—	B.C. Mainland
R. E. Foster	—	Vancouver Island

REPORT OF THE SECRETARY-TREASURER

Mr. President and Fellow Members:

I have the honour of presenting the following report of the Secretary-Treasurer for the fiscal year, ending May 31, 1953.

The 19th annual meeting of the Society was held in the Chateau Laurier, Ottawa, June 23-26, 1952, and has been summarized in Proceedings No. 20, issued February 5, 1953. Twenty-six papers were presented by members of the Society. Invitation papers by Drs. Kingsley Kay and W. L. Ball of the Industrial Health Laboratory, Dept. of National Health and Welfare, Ottawa, entitled "A practical approach to the toxicological evaluation of insecticides and fungicides" and by S. H. Zamin Naqvi, Dept. of Plant Protection, Ministry of Food and Agriculture, Karachi, Pakistan, "The production of thiamin by *Cercospora cruenta* Sacc." were heard. The large attendance of visitors indicated the interest in these papers and taxed the seating accommodation to the limit.

During the year two numbers of volume V of the C.P.S. News were issued. The first contained a detailed account of the paper by Dr. J. W. Groves, "The International Rules of Botanical Nomenclature," including the recent changes adopted by the VII International Congress at Stockholm, and the second, a letter from Dr. Wm. Newton, who has been granted leave of absence to join F.A.O. in Ceylon, in which first impressions on the pathological problems of that country are described.

The membership of the Society now stands at 193 as compared with 175 at this time last year, with 12 applications on hand. The deaths of Dr. Otto Appel and Mr. Edgar Thornton Reeder have been regretfully recorded. The election of Prof. J. G. Coulson to fellowship in the Agriculture Institute of Canada is a reflected honour to the Society. At the 1952 Annual Meeting, Dr. J. H. Craigie was elected to honorary membership in the C.P.S.

The attached financial statement shows a favourable balance of $416.45, as compared with $239.27 last year.

Respectfully submitted,

A. J. SKOLKO,
Secretary-Treasurer.

FINANCIAL STATEMENT
CANADIAN PHYTOPATHOLOGICAL SOCIETY

June 1, 1952 to May 31, 1953.

Revenue :

Balance brought forward			$239.27
Fees :			
1950-51	$ 4.00		
1951-52	56.00		
1952-53	256.00		
1953-54	39.00		
1954-55	3.00		
1955-56	2.00		
1956-57	2.00		
		$362.00	
Interest on bond		15.00	
Sale of Proceedings		2.50	
Proceeds of annual meeting		51.00	
			$430.50
			$669.77

Expenditures :

Printing of Proceedings No. 20	$188.78	
Honorarium for stenographic assistance	20.00	
Postage	35.55	
Stationery	6.53	
Bank charges and exchange	2.46	
		$253.32
Balance (on hand) May 31, 1953		$416.45

Additional Asset :

Dominion of Canada 3% Victory Bond (Series K8Z32643) $500.00

Audited and found correct,

(Signed) M. K. NOBLES
J. WALTON GROVES

REPORT OF THE CUSTODIAN OF THE LIBRARY AND RECORDS OF THE SOCIETY

Forty-five accessions to the library were received during the year 1952-53. This brings the total number of items in the library to 561. Items received during the past year were indexed.

The following are the chief publications at present received in exchange for C.P.S. Proceedings :

Proceedings Montana Academy of Sciences.

Yearbook of the Royal Veterinary and Agricultural College, Copenhagen, Denmark.

Annales des Epiphyties of the Institut National de la Recherche Agronomique, Paris, France.

Bulletins and papers of the Commonwealth Scientific and Industrial Research Organization, Australia.

Contributions de l'Institut d'Oka, Quebec.

Reprints received during the year included reprints of papers published by members of the laboratories of the Division of Botany, Science Service. These were supplied by the librarian of the Division at Ottawa.

A group photograph taken at the 1952 meeting of the Society at Ottawa has been supplied by the Secretary.

T. JOHNSON

REPORT OF THE EDITORIAL COMMITTEE

The Proceedings of the Nineteenth Session of the Canadian Phytopathological Society were issued on February 5, 1953. They contain the report of the meeting held at Ottawa, Ontario, June 23-26, 1952, a group photograph of those attending, twenty-eight abstracts of papers read at the meeting, and obituary notices for Professor Otto Appel and Edgar Thornton Reeder.

The list of papers published by members of the Society during the preceding year was omitted because this information could not be assembled in time for publication.

It is recommended by the Committee that, if possible, future Proceedings should be published by the end of August following the meeting. This would greatly facilitate the excellent work of the Secretary-Treasurer in preparing the material for the Proceedings, and would bring the Proceedings to the members at a time when interest in the meetings is still maintained.

It is further recommended that the list of papers published by the members of the society from June 1, 1951 to June 1, 1953, be included in the Proceedings of the 20th Session of the Canadian Phytopathological Society.

G. W. AYERS
M. F. WELSH
A. J. SKOLKO
RUTH HORNER (Chairman)

REPORT OF THE NOMINATING COMMITTEE FOR 1952-53

The slate of officers as approved by the nominating committee of the C.P.S. is as follows:

President	P. M. Simmonds
Vice-President	W. C. Broadfoot
Secretary-Treasurer	A. J. Skolko
Councillors	J. C. Perrault
	J. J. Miller

Respectfully submitted,

W. Newton
A. N. Langford
H. M. Good
L. W. Koch
G. H. Berkeley (Chairman)

REPORT OF THE TERMINOLOGY COMMITTEE OF THE C.P.S.

The terminology of plant diseases caused by viruses was given particular attention by the committee during the past year. A report prepared by M. F. Welsh, who as a member of the committee was asked to examine this field of terminology, formed the basis for study. This report was widely circulated and made available for the scrutiny of a representative cross-section of C.P.S. members. A revision, taking suggestions and criticisms received into consideration, is in preparation and will be made available to members in the near future.

Other sections of plant disease terminology were also studied during the past year with the expectation of preparing similar reports on them. Good progress has been made on some of these as well. The section of Forest Pathology, for instance, under the supervision of D. C. Buckland, is well on the way toward the stage for general circulation.

Inasmuch as a point has been reached in the work of the committee when extra stenographic assistance is needed, it is recommended that provision for this be made by the C.P.S.

Respectfully submitted,

D. C. Buckland
J. H. Craigie
W. A. F. Hagborg
D. L. Bailey
B. H. MacNeill
H. M. Good
R. S. Willison
R. A. Ludwig
W. E. McKeen
W. A. Hodgson
C. D. McKeen
A. N. Langford
R. Pomerleau
L. E. Tyner
M. F. Welsh
T. C. Vanterpool
A. W. Henry (Chairman)

REPORT OF THE C.P.S. COMMITTEE ON PLANT DISEASE DIAGNOSIS

Wm. Newton resigned as Chairman of this committee in December, 1952 and the Secretary asked H. W. Mead to take over. An investigation of possibilities for setting up libraries of kodachrome slides by the Society, as suggested at the 1952 meeting, was started by Dr. Newton and has been continued by circularizing members of the committee and regional representatives. In the latest circular letter a request was made for opinions on the feasibility of the scheme, suggestions for ways and means, and some indication of slides available for duplication, loan and donation. The replies to this letter indicated that of the sixteen who answered, eleven supported the idea, with a few reservations, three thought the idea good idealistically, and two indicated that no slides were available now.

The necessity for careful investigation of the project before action was taken was emphasized by several correspondents. Several concrete suggestions for the establishment of a central filing agency were made, and the value of a list of slides now on file at various laboratories was stressed. Several correspondents expressed doubt on how much use would be made of a kodachrome library if it were established, while others listed many uses for such a library. The cost of duplication and purchase of slides was indicated.

Offers of co-operation in supplying slides for duplication, loan and donation were made by many of those who supported the scheme. Slides (including personally-owned slides) were offered as follows:

For duplication: 884 plus 250 of fleshy fungi
For loan: 998
For donation: 28

Respectfully submitted,

W. E. Sackston
G. B. Sanford
G. C. Chamberlain
D. J. McLeod
Frances C. Mellor
W. G. Benedict
H. W. Mead (Acting Chairman)

REPORT OF THE PUBLICATIONS COMMITTEE

At the business session of the 1952 annual meeting, the proposal originating with Canadian Agricultural Economics Society to have the journal of the A.I.C., "Scientific Agriculture", subdivided by subject matter was discussed. It was decided at that time to refer the subject to the Editorial Committee but subsequently the council decided that the proposal was of sufficient importance to members of the C.P.S. to warrant establishment of a special committee. Thus, the Publications Committee consisting of Dr. F. L. Drayton, Dr. G. H. Berkeley, and Dr. W. F. Hanna (chairman) was appointed. The question of subdividing Scientific Agriculture resolved itself, as far as this committee was concerned, when it was decided by the A.I.C. to drop the proposal and retain the editorial policy essentially unchanged but with the name of the journal changed to "Canadian Journal of Agricultural Science".

Recently, the Canadian Society of Microbiologists have suggested that a new journal be established in the National Research Council journal series to provide a Canadian medium for publication of scientific papers in the field of microbiology. In seeking support for this proposal, the secretary of the C.S.M. has requested that an opinion of the C.P.S. be forwarded to the president of N.R.C. for consideration when a decision is to be made. The members of the C.P.S. at Ottawa have been asked for their views and have not supported the proposed new journal as an outlet for mycological or plant pathological papers in preference to existing journals, notably the Canadian Journal of Botany. The Publications Committee would benefit by the opinion of this meeting in preparing their reply to the C.S.M.

F. L. Drayton
G. H. Berkeley
W. F. Hanna (chairman)

REPORT OF THE REPRESENTATIVE TO THE CANADIAN SOCIETY OF MICROBIOLOGISTS

The third annual meeting of the Canadian Society of Microbiologists was held at the Ontario Agricultural College, Guelph, June 4-6, 1953. Registration was about 150. Some 33 scientific papers were presented and discussed. Two symposia, one on "Industrial Microbiology" and one on "Diseases of Wild Life in Canada" were special features of the scientific programme.

Visiting members and their partners were guests of O.A.C. at an informal get-together on Wednesday evening, and were guests of O.V.C. at tea on Friday afternoon.

The annual dinner held in Creelman Hall on Thursday evening was attended by about 140 members. At this dinner Dr. J. H. Craigie was presented with an Honorary membership in the society. Reference was also made to other Honorary memberships which had been presented at the homes of the recipients during the year — one to Dr. John Dearness and one to Dr. Norman MacLeod Harris. A buffet-smoker held at the Royal Hotel on Friday night was also well attended.

Dr. E. G. D. Murray of McGill, a plenary member, will head a delegation of 14 members who plan to attend the International Congress of Microbiology in Rome in September. Any other members of the Society of Microbiologists who plan to attend the Congress are requested to communicate their intentions to Dr. Norman Gibbons, N.R.C., Ottawa, and become official delegates.

Several important matters were considered at the Council Meeting and at the general business meeting.

It was noted that the increase in membership during the year was 136, which brings the total membership to over 350. It was decided to accept the invitation of Queen's University for the 1954 annual meeting. The meeting will be held just prior to the meeting of the Canadian Phytopathological Society at MacDonald College, which will minimize travel for any interested in attending both. It was also decided to continue exploring the possibilities of a Canadian Journal of Microbiology.

The society wishes to again point out that no financial obligation is involved in the case of another society affiliating with it. In lieu of any affiliation the society welcomes a representative on its council from the Canadian Phytopathological Society and wishes to know if the latter would like to continue appointing such a non-voting representative.

Respectfully submitted,

A. R. Walker.

REPORT OF THE RESOLUTIONS COMMITTEE

Whereas the Canadian Phytopathological Society has held its 20th Session at Saskatoon, June 22-25, 1953, in conjunction with the Annual Convention of the Agricultural Institute of Canada, and whereas the accommodations and facilities placed at the disposal of the Society have contributed notably to the success of the sessions;

Be it resolved we extend our sincere appreciation to:

(1) Our hosts, the North Saskatchewan Branch of the Agricultural Institute of Canada.

(2) Dr. B. J. Sallans, Chairman, Program and Publicity Committee and members of his committee, for preparing the program and making arrangements for the annual dinner.

(3) Rohm & Haas Co. of Canada Ltd., Naugatuck Chemicals — Division of Dominion Rubber Co. Ltd., Niagara Brand Spray Co. Ltd., Canadian Industries Ltd., Chipman Chemicals Ltd., Dow Chemical of Canada Ltd., and Green Cross Products — Division of The Sherwin-Williams Co. of Canada Ltd. for the reception at our Annual Dinner.

Respectfully submitted.

W. S. Sackston,
L. E. Tyner,
R. C. Russell (chairman).

ABSTRACTS OF PAPERS PRESENTED AT THE TWENTIETH MEETING OF CANADIAN PHYTOPATHOLOGICAL SOCIETY

NOTES ON POTATO VIRUS A

R. H. Bagnall, Plant Pathology Laboratory, Fredericton, New Brunswick.

Certain potatoes of European and American origin when grown under New Brunswick conditions show practically no symptoms when infected with Potato Virus A or certain strains of Potato Virus X alone. Most of these potatoes, however, exhibit distinct mosaic symptoms when infected with a combination of these viruses. It is obvious that if stocks of these potatoes or other varieties behaving in a similar manner are maintained free from virus X they may serve as symptomless carriers of the insect transmitted virus A. This emphasizes the need of combining resistance to virus A with resistance to virus X in all potatoes intended for commercial use. Resistance to these important viruses occurs in certain commercial potato varieties. The British varieties Epicure and Craig's Defiance are hypersensitive toward viruses A and X, and are therefore extremely resistant to these viruses under field conditions. Canso, Katahdin, and Irish Cobbler are hypersensitive toward virus A. The U.S.D.A. Seedling 41956 is immune to virus X, but this potato is almost a symptomless carrier of virus A.

LEAF BLOTCH OF STRAWBERRY IN CANADA.

A. T. Bolton, Botany and Plant Pathology Division, Ottawa, Ontario.

Gnomonia fructicola (Arnaud) Fall was isolated from strawberries growing in various localities in Ontario and Quebec. This fungus was found to be capable of causing serious damage to strawberries under certain environmental conditions. Symptoms of the disease occur on fruits, peduncles, and petioles and blades of the leaves of the plants. On the leaf blades and petioles, the disease first manifests itself as numerous pin-point lesions which enlarge and coalesce, and finally cover large areas of leaf tissue, or entirely girdle the petioles. The fungus was found to enter the stomata of the blades and petioles of the leaves, thus infecting the host. In the host, the fungus tends to follow along the vascular elements where the pycnidia and perithecia are usually formed.

Pathogenicity of *G. fructicola* was compared with that of the other most common diseases of the foliage of strawberry. It was found to be able to cause as much damage to the host as the other diseases under the conditions described.

Nutrition experiments were carried out in which it was found that high concentrations of dextrose suppressed growth and reproduction in *G. fructicola,* whereas starch, cellulose, and pectin in high concentrations favoured growth and reproduction.

Finally, the *G. fructicola* isolated from strawberries in Canada was compared with cultures of the organism isolated from strawberries in three localities in Europe. The three fungi from Europe were considerably different from the fungus isolated in Canada, as well as from one another. It is suggested that strains of the organism may occur.

THE INFLUENCE OF SOME ASSOCIATED MICROORGANISMS ON THE PATHOGENICITY OF *HELMINTHOSPORIUM SATIVUM* P., K., & B.

W. P. Campbell, Plant Pathology Laboratory, Edmonton, Alberta.

A number of soil fungi were tested in natural and sterilized soil for their effect on the pathogenicity of *Helminthosporium sativum*. Six species, three of which strongly limited the action of the parasite, and three of which had little effect, were selected for further testing. In the first group were *Trichoderma viride, Phoma humicola,* and *Epicoccum purpurascens,* and in the second group were *Actinomucor repens, Sclerotinia trifoliorum,* and *Myrothecium verrucaria.* As soil temperature increase from 10° to 26° C., each of these fungi increasingly depressed the pathogenicity of *H. sativum.* The pH shifts which these fungi induced in soil were not sufficient to be considered as a factor. In plate tests on a non-enriched, soil extract medium, *S. trifoliorum* and *A. repens* were not found to affect *H. sativum* appreciably. The other four all caused spore distortion and breakdown. *M. verrucaria* and *E. purpurascens* were found as internal parasites in *H. sativum* spores. *M. verrucaria* was not effective against the mycelium of *H. sativum,* but the other three caused its breakdown, with *E. purpurascens* and *P. humicola* found as internal parasites. The test fungi were found to produce some material in the medium which adversely affected the germination and germ-tube growth of *H. sativum, S. trifoliorum* and *A. repens* were intermediate in their action, and *E. purpurascens* and *M. verrucaria* were very severely limiting.

A PROGRESS REPORT ON STUDIES OF THE DEAD ARM DISEASE OF GRAPES IN THE NIAGARA PENINSULA

G. C. Chamberlain, Plant Pathology Laboratory, St. Catharines, Ontario.

Dead arm disease of the grape vine caused by *Cryptosporella viticola* (Reddick) Shear, is a common and troublesome disease in Niagara peninsula vineyards ten years of age and older. Recent investigations in Ontario have established that in addition to the extensive necrotic cankers in stem and arms, long recognized as associated with the disease, small lesions also occur on early shoot growth and may be found on petioles, tendrils, peduncles and foliage as well. It is believed that the infection on the current season's growth, overlooked for many years, is an important factor in the present high incidence of the disease. Evidence suggests that sprays are effective in reducing the infection on the current growth.

The perithecia of the causal organism have not been found but pycnidia of the *Fusicoccum* type are produced commonly on infected host parts and in pure culture. Pycnidia are also encountered containing a second spore type, the scolecospore, either alone or in combination with the fusoid spores. These have developed in pure culture established from monospore inoculum. Both types of spores have been found associated with dead arm by others and Goidanich in Italy named the fungus *Phomopsis viticola* (Redd.) Goid. n. comb., on this basis.

Numerous inoculations of both mature wood and shoot tissues have been made using isolates from cane, shoot, and trunk infections, employing different techniques and made at different times of the year. The most successful inoculations have followed die-back such as occurs with prominent pruning stubs or saw-cut-wounds on trunk or arms. Inoculations made in May, June and July have resulted in greater infection than those made in other months. The progress of the infection however, has been slow and it would appear that a vine may be infected for a year or longer before vine symptoms are present.

An evaluation of the merits of summer pruning of dead arm vines is a phase of the investigation. Important practical advantages found to pertain to summer pruning are : earlier removal of diseased wood; a greater opportunity to save bearing wood, to select and train renewal stems and to secure quicker replacement; less uncertainty on the part of the growers as to the infected vines and the extent of pruning required. On the other hand there is the danger of re-infection of pruning cuts made in May or June, a factor which needs to be fully assessed.

A SLIDE TECHNIQUE FOR THE STUDY OF FUNGI AND ACTINOMYCETES IN SOIL

S. H. F. Chinn, Plant Pathology Laboratory, Saskatoon, Saskatchewan.

A newly developed technique capable of demonstrating growth behavior of fungi and actinomycetes in soil is described. Of the nine fungi and one actinomycete studied, seven of the fungi were unable to germinate in natural soil but the remaining two fungi and the actinomycete were capable of varying degrees of germination. However, in two-percent soybean meal amended soil all except three of the cultures germinated well. One culture did not respond to the amendment. The technique also demonstrated lysing or further development of the germ tubes after germination of the spores.

A PUNCH CARD SYSTEM FOR RECORDING DATA ON PLANT VIRUSES

R. E. Fitzpatrick, Plant Pathology Laboratory, Vancouver, British Columbia.

A hand-sort punch card system for recording facts about individual plant viruses is described. Cards used are 10½" x 8" double punch key-sort cards. Each virus is allotted a card and a description of the virus, following the system used by Holmes, is typed directly on the card.

DEVELOPMENT OF ALFALFA CROWN BUD ROOT

E. J. Hawn, Plant Pathology Laboratory, Lethbridge, Alberta.

Data compiled from detailed surveys strongly indicate that the major portion of the annual increase in alfalfa crown bud rot occurs during the early part of the growing season. This was confirmed in field plot work which showed that 80.6 per cent of the total 1952 increase occurred in May.

Stained preparations of crown bud tissue reveal extensive penetration and ramification by mycelium of *Rhizoctonia solani* and *Fusarium* spp. in 15 days under greenhouse conditions.

DETERMINATION OF AMINO ACIDS IN WHEAT ROOTS BY PAPER CHROMATOGRAPHY

S. B. Hrushovetz, Plant Pathology Laboratory, Edmonton, Alberta.

Employing the paper chromatography technique of Consden et al, as modified by Dent for plant tissue, some 15 alpha amino acids were found in 80% ethanol extracts of healthy wheat roots and wheat roots diseased by *Helminthosporium sativum*. A quantitative procedure employing the spot dilution technique showed that lysine, alanine, asparagine and serine were in much higher concentration in diseased tissue, although the reverse was true for alpha amino butyric acid. Concentrations of serine and alanine were more than doubled in the diseased tissue. Upon hydrolysis it was found that, except for phenylalanine and the basic amino acid arginine, all amino acids were in greater concentration in the diseased tissue. Calculations showed that the amino acids inherent in the pathogen itself could not account for the differences observed as between healthy and diseased root tissue. Therefore it appears that invasion of wheat tissue by *H. sativum* results in an increase in amino acids.

A CULTURAL METHOD FOR REDUCING THE INCIDENCE OF COMMON ROOTROT IN WHEAT

R. J. Ledingham, Plant Pathology Laboratory, Saskatoon, Saskatchewan.

Turning under of stubble and surface debris with the bold-board plough prior to planting wheat reduces the incidence of common rootrot in the ensuing crop. In general, yields from this treatment have been higher than from comparable fields which were surface worked. The beneficial results of ploughing appear to be due to burial of the surface layer, which contains much of the inoculum of *Helminthosporium sativum,* the pathogen mainly responsible for common root-rot.

STUDIES OF THE FUNGICIDAL ACTIVITY OF DISODIUM ETHYLENEBISDITHIOCARBAMATE

R. A. Ludwig, G. D. Thorn, & D. M. Miller, Science Service Laboratory, London, Ontario.

Aeration of dilute solutions of disodium ethylenebisdithiocarbamate (Nabam) results in the proportion of a yellow fungicidal precipitate containing about 15% elemental sulfur, 10 to 20% ethylene thiuram monosulfide and between 65 and 75% of a material considered to be polyethylene thiuram monosulfide. The E.D. 50 value of the parent material against *Sclerotinia fructicola* lies between 15 and 25 p.p.m. while that of ethylene thiuram monosulfide lies between 0.5 and 1.5 p.p.m. Polyethylene thiuram monosulfide has an E.D. 50 value intermediate between these two. Greenhouse tests substantiate this evidence of high fungicidal activity.

The presence of ethylene thiuram monosulfide and its polymer has been demonstrated on the foliage of Nabam-sprayed plants. Their formation appears to explain the fungicidal activity of Nabam.

A METHOD FOR ANALYZING POTATO VIRUSES

D. J. MacLeod, Plant Pathology Laboratory, Fredericton, New Brunswick.

A method is described for analyzing the viruses and strains commonly occurring in potato stocks in Canada. In this scheme of analysis it is assumed that all these common viruses are present and are systematically separated and identified. The viruses are classified into six main groups according to their characteristic modes of transmission and other distinctive features. The individual viruses are identified by means of special plant indicators, certain chemical and physical properties, serological reactions, and spectrophotometric methods. The strains of most of the viruses are confirmed by cross protection tests. The following viruses were identified in the potatoes examined according to this scheme of analysis — Virus A, B, C, D, E, F, G, X, Y, calico, leaf roll, leaf rolling mosaic, purple-top (bunch-top), spindle tuber, witches' broom, and yellow dwarf. Strains of virus X corresponding to those described by Salaman as H, G, D, L, S and N were identified in the potatoes analyzed. Three strains of virus Y were distinguished and an unusual disease designated as streak and roll is described.

THE ROLE OF VERTICILLIUM WILT IN REDUCING TOMATO YIELDS IN THE B.C. INTERIOR

H. R. McLarty & G. E. Woolliams, Plant Pathology Laboratory, Summerland, British Columbia.

In eighty-seven fields (1,000 acres) selected at random over the tomato growing districts, it was found that 55 per cent of plants were affected. On 700 plants, some of which were healthy and some affected, crop production records indicated a loss in production on affected plants of approximately 12 per cent. Total crop produced in 1952 season was 24,721 tons. It is estimated from the percentage-affected, and loss-in-production figures obtained, that this tonnage would have been 1,728 tons greater if the disease had not been present.

THE EFFECT OF CHEMICAL AND CULTURAL TREATMENTS ON STAND OF GRASSES AND LEGUMES

H. W. Mead, Plant Pathology Laboratory, Saskatoon, Saskatchewan.

Experiments in the greenhouse have shown that fungicides such as Arasan, Spergon, Phygon, and Semesan may increase the number of healthy seedlings of the grasses and legumes recommended for planting in the prairie provinces when seed of these crops is planted in soil infested with fungi which cause seedling blight. Very few significant increases in stand have been obtained in naturally infested field plots planted with these crops.

Some evidence has been obtained to show that the stand of sweet clover is better on land cropped during the previous year with cereals, corn, and rape than on summerfallowed land or land broken from grass and legumes.

CROWN AND STEM ROT OF PANSY CAUSED BY *MYROTHECIUM RORIDUM* TODE

W. R. Orchard, Plant Pathology Laboratory, Saanichton, British Columbia.

The fungus *Myrothecium roridum* Tode., the causal organism of crown and stem rot of pansy, was first isolated from diseased pansy plants grown in British Columbia in 1947. The average yearly loss in three Vancouver Island commercial pansy seed plantings since 1947 was 20%. Field symptoms of the disease are a darkening of the crown parts followed by a breakdown of stem tissues, causing wilting and death of affected plants. At this stage, numerous sporodochia of the fungus, characteristic of the genus *Myrothecium,* are usually present at the base of the stems. Morphological and cultural characteristics of the fungus agree with the description given by Preston (1946). In pathogenicity experiments, the fungus proved pathogenic to the Swiss Giant, Royal Giant, and Giant Trimardeau varieties of pansy, and plants inoculated with the pathogen developed typical symptoms of crown and stem rot. The fungus grew at controlled temperatures from 7° C. to 34° C. with optimum growth at approximately 28° C. and pH 7.8. The removal and destruction of diseased plant debris together with a good rotation practice is advocated as a partial control measure.

UROMYCES RUSTS OF *SPARGANIUM* AND *ACORUS* AND THEIR ALTERNATE HOSTS

J. A. Parmelee and D. B. O. Savile, Botany and Plant Pathology Division, Ottawa, Ontario.

Rusts of *Sparganium* and *Acorus* have long been treated as two species, *Uromyces sparganii* and *U. pyriformis* respectively. As pycnia and aecia were unknown the life-cycles of each rust have remained incomplete.

For many years it was noticed that the rusts on these plants were morphologically indistinguishable and that very often there was an association of the two. Where both hosts flourished, if one showed rust infection the other also showed rust infection.

In the early summer of 1952, the writers, in an effort to complete the life history of at least one of the rusts in question, visited a site where both were known to occur. There, an *Aecidium* on *Hypericum virginicum* was found, and it was usually associated with infected *Acorus.* The *Aecidium* proved to be morphologically distinct from the aecial stage of *Uromyces hyperici* the only other rust described on *Hypericum.*

A site was chosen where uninfected *Acorus* and *Sparganium* were known to grow abundantly. Both plants showed rust infection some weeks after the aecidium-bearing *Hypericum* was transplanted among them.

If subsequent field cultures bear out the above evidences, then the rust parasitizing *Sparganium eurycarpum* and *Acorus calamus* is one species, a hetero-eu form having its imperfect stage on *Hypericum virginicum.* In the eastern hemisphere especially it seems more than likely that other *Hypericum* species also in the section *Elodea* are possible OI hosts. And, if there is but one rust species involved, then, according to the rule of priority, *Uromyces sparganii* C. & P. is the proper binomial.

THE RELATIVE PREVALANCE OF SPECIALIZED FORMS OF *PUCCINIA CORONATA* CORDA THAT OCCUR ON *RHAMNUS CATHARTICA* L. IN CANADA

B. Peturson, Plant Pathology Laboratory, Winnipeg, Manitoba.

Surveys were made during the period of 1947-1951 to determine the prevalence and distribution of the *formae speciales* of *Puccinia coronata* which occur on *Rham-*

nus cathartica in Canada. From 96 aecial collections obtained in Manitoba and in Eastern Canada on *R. cathartica,* three distinct *formae speciales* of *P. coronata* were isolated. Two of these, *f. sp. avenae* and *f. sp. festucae,* had been isolated previously in both Europe and America. The third form, which could not be identified with certainty with any previously described form, was pathogenic on many species of wild and cultivated grasses, as well as on many varieties of barley and rye, but was non-pathogenic on oats. It was given the designation *P. coronata f. sp. secalis f. sp. nov.* The uredial stage of *f. sp. secalis* was much darker in colour than the corresponding stage of the other two forms and it could be distinguished from them quite readily. The forms *avenae* and *secalis* occurred in Manitoba and Eastern Canada, while the form *festucae* was found in Eastern Canada only. In Eastern Canada the forms *avenae, secalis,* and *festucae,* in the order named, comprised 60.6, 36.6, and 2.8 per cent of the isolates. In Manitoba, the form *avenae* comprised 16, and the form *secalis* 84 per cent of the isolates.

PHOMA SPP. ON FLAX IN SASKATCHEWAN

E. T. Reeder and T. C. Vanterpool, University of Saskatchewan, Saskatoon, Saskatchewan.

A species of *Phoma* highly pathogenic to flax has been isolated occasionally from flax seed during the past twelve years. Only rarely has it been found on growing flax in the moister areas where small groups or scattered plants were severely attacked. Experimentally, it causes severe pre-emergence killing, reducing germination by as much as 75 per cent. It overwinters readily on flax stubble. Victory flax was the only common variety which showed moderate resistance. In liquid culture it produces a toxic substance which inhibits the germination of flax seed. Morphologically it is considered as a form of *P. exigua* Desm. Another species frequently isolated from flax bolls and seeds and found to be virtually non-pathogenic is *P. conidiogena* Schnegg. *Ascochyta* spp., with 2-celled spores predominating, are also commonly isolated, but these have proved completely non-pathogenic to flax. No *Phoma* or *Ascochyta* sp. isolated from wild flax, *Linum lewisii* Pursh, has been found to be pathogenic on cultivated flax.

Comparative studies of Canadian forms were made with cultures of *Phoma* spp. causing root rot of flax obtained from the following sources: one from North Ireland, three from Scotland, and *P. lini* Pass. and *Ascochyta linicola* Naoum. and Vass. from the C.B.S. One Scottish form fell into the *P. conidiogena* group; the other two Scottish forms, the North Ireland form, and the C.B.S. strains of *P. lini* and *A. linicola* formed another group. It is recommended that this latter group be considered as *P. lini* Pass. rather than *A. linicola* Naoum. and Vass. mainly because of the absence or low percentage, 1 to 4, of 2-celled spores. This form has not yet been encountered in Western Canada.

WHIPTAIL OF CAULIFLOWER IN PRINCE EDWARD ISLAND

D. B. Robinson, Plant Pathology Laboratory, Charlottetown, P.E.I.

Crop losses in cauliflower due to the 'whiptail' disease were completely prevented in two years of testing by soil applications of sodium molybdate. Raising soil pH by lime applications partially prevented the disease.

A marked accumulation of nitrates occurred in the leaves of 'whiptail' plants.

PROGRESS REPORT ON THE CONTROL OF LOOSE SMUT OF BARLEY BY THE COLD WATER SOAK TREATMENT

R. C. Russell, Plant Pathology Laboratory, Saskatoon, Saskatchewan.

At our last annual meeting it was reported that loose smut of barley had been controlled at our laboratory by soaking the infected barley seed in water at a temperature of 70° F. for 80 to 96 hours.

During the summer of 1952 several field experiments were conducted to study different aspects of the cold water treatment. Treatment of heavily infected Montcalm barley for 80 and 90 hours at 40° F. gave very slight control, but when the

seed was treated for 80 hours at 70° F., the infection was reduced from 11.8 per cent to 1 per cent, and prolonging the treatment to 90 hours reduced it to 0.05 per cent. In another experiment it was found that the treatment of 3 infected samples for 64 hours in open vessels reduced the average percentage infection to 4.9, while treating for the same period at the same temperature in closed flasks reduced the average infection to 1.7 per cent.

Two half-bushel lots of Montcalm barley carrying approximately 10 per cent and 20 per cent infection, respectively, were treated and sown on a scale comparable to that required on farms for the production of smut-free seed. No smut appeared in either treated plot but the yield was reduced to a moderate extent.

SOME EFFECTS OF RUST ON SUNFLOWERS

W. E. Sackston, Plant Pathology Laboratory, Winnipeg, Manitoba.

Field experiments were made at Winnipeg in 1952 to determine the effect of rust on the yield and quality of sunflower seed. Plots of the female (S37-388) and male (Sunrise) parents of the commercial hybrid variety Advance were sown May 13, May 20, and May 29. Some of the plots sown at each date were inoculated with rust on July 8, and some on July 30. Check plots were not inoculated.

The severity of rust infection did not appear to be affected by differences in the date of sowing, and the resulting differences in relative maturity, of the inoculated sunflowers. The earliest inoculations gave rise to the heaviest rust infections. Inoculation at the second date, and natural spread of rust to the uninoculated check plots, resulted in approximately equal infections, which remained somewhat lighter than in the first-inoculated plots.

The yield of Sunrise seed was almost the same from check plots and plots inoculated July 30. Plots inoculated July 8 yielded 17% less than the checks. Check plots of S37-388 yielded 38% less seed, and early-inoculated plots yielded 68% less seed, than S37-388 plots inoculated July 30.

The mean 200-seed weights of samples of both varieties from plots inoculated July 8 were lower than from check plots. The differences were not statistically significant. The oil content of the seed, although not significantly different for samples from inoculated and uninoculated plots, was slightly lower from the first-inoculated plots than from the checks. The protein content of the seed was not affected appreciably by rust inoculation.

Early seeding of both varieties resulted in higher yields of seed, and heavier seeds. The effects on oil content and protein content of the seeds were variable. As rust intensity was similar in inoculated plots sown at each of the three dates, early sowing apparently helped to control rust damage by shortening the period during which the host was affected.

PRELIMINARY INVESTIGATIONS ON THE CHEMICAL CONTROL OF SUNFLOWER RUST

W. E. Sackston, Plant Pathology Laboratory, Winnipeg, Manitoba.

The fungicides Parzate, Manzate, sulphur, and Phygon XL were applied to field plots of the sunflower variety S37-388 at Winnipeg in 1952, to assess their effectiveness against rust. All plots were inoculated with rust when the sunflowers were about two feet high. The respective fungicides were applied to replicated plots five days before inoculating with rust, to some plots a second time four days after inoculating, and to some plots a third time, two weeks after inoculating, when rust pustules had appeared. Check plots were inoculated with rust but were not treated with chemicals. Parzate, Manzate, and sulphur were applied as dusts, Phygon XL was applied as a spray.

Rust infections were lightest in the plots treated with Parzate and Manzate, heavier in plots treated with sulphur and Phygon XL, and heaviest in untreated check plots. Increases in seed yield over the yield from check plots, resulting from the various treatments, were as follows: Parzate 98%, Manzate 78%, sulphur 43%, and

Phygon XL 9%. All increases except that due to Phygon were significant. The respective treatments also affected the weight of 200-seed samples and the oil content of the seeds. The treatments, arranged in the order of decreasing 200-seed weight and oil content of samples from the respective plots, were : Parzate, Manzate, sulphur, untreated check, Phygon XL. The 200-seed weights from the Parzate plots were the only ones that were significantly different from the checks. Differences in the oil content of the seeds were not statistically significant. The highest protein content was found in seed samples from the check plots and the Phygon XL plots, but the differences were not statistically significant.

Calcium sulfamate, recently discovered to be an eradicant for wheat stem rust, was tried against rust on sunflower seedlings in the greenhouse. In one experiment, the chemical was found to have very limited eradicant action except when it was applied on the day of rust inoculation or the day after inoculation. Calcium sulfamate sprayed onto sunflower seedlings caused considerable leaf and hypocotyl injury. The chemical was not systemic in its action against rust, as pustules developed on the uninjured green portions of some leaves which were severely damaged. Spores collected from pustules on sprayed plants germinated normally. In another experiment, calcium sulfamate seemed to have some protectant effect when applied the day before inoculating with rust.

Parzate spray, applied before inoculating with rust, protected sunflower seedlings from infection. Applied one or more days after inoculating, Parzate had no apparent effect. It did not injure the seedlings. Mixtures of calcium sulfamate and Parzate had the same effect as calcium sulfamate alone.

DEPTH OF CROWN FORMATION IN WHEAT IN RELATION TO ROOT DISEASES

B. J. Sallans, Plant Pathology Laboratory, Saskatoon, Saskatchewan.

Helminthosporium sativum and *Fusarium culmorum* appear to be more infectious in crowns of wheat at shallow than at deep levels in the soil. There is evidence also that injury to the plant is greatest when the crowns are near the surface of the soil where temperatures are often rather high. Varieties of wheat differ markedly in elongation of their subcrown internodes and consequently in the levels at which the crowns form. Low soil temperatures favour deep formation of crowns, and low light intensity causes the crowns to develop close to the soil surface.

ACERIA TULIPAE, A VECTOR OF WHEAT STREAK MOSAIC

J. L. Slykhuis, Plant Pathology Laboratory, Lethbridge, Alberta.

Mites of the species *Aceria tulipae* Keifer found on diseased wheat in southern Alberta transmitted wheat streak mosaic when placed on healthy plants. Non-viruliferous colonies of mites were developed from eggs transferred to disease-free wheat. Experiments with mites from these colonies have proven the ability of *A. tulipae* to transmit streak mosaic isolated from wheat in Alberta, South Dakota, and Kansas.

When viruliferous mites were colonized on hosts immune to streak mosaic, some of the mites remained viruliferous at least four days.

Grass hosts that have been infected with streak mosaic by the mites in greenhouse experiments include *Triticum vulgare, T. durum, T. dicoccum, T. timopheevi, Hordeum vulgare, Secale cereale, Setaria viridis,* and *Echinochloa crusgalli* including Japanese millet and the wild barnyard grass. A number of *Triticum* x *Agropyron* crosses were tested for their reactions to streak mosaic and mites. There was a close correlation between the reactions to streak mosaic resulting from mite transmission as compared with the manual method of transmission. There was also a positive correlation between susceptibility to streak mosaic and to mites.

Although the mites prefer tender young plants, wheat may become infested with mites and hence infected with streak mosaic at least as late as the jointing stage.

Several stages of live mites in addition to eggs were found on winter wheat collected from a field in December, February, and March. Eggs from plants collected in late March hatched when placed on a glass slide in a moist chamber at a temperature of + 25° C.

Experiments in the greenhouse have shown that the mites are readily carried by wind, hence wind is probably an important agent for spreading mites and wheat streak mosaic under field conditions.

EFFECT ON ITS SUBSEQUENT GERMINATION OF SOWING TREATED AND UNTREATED WHEAT, OAT, AND BARLEY SEED IN SOIL OF SUB-GERMINATION MOISTURE CONTENT

H. A. H. Wallace, Plant Pathology Laboratory, Winnipeg, Manitoba.

This is a continuation of experiments concerned with the effect on germination of sowing seed in "dry" soil. It was observed during these earlier experiments that damaged seed (frosted, sprouted, or fractured), when sown in soil with a moisture content just below the minimum required for germination, tended to be invaded by species of *Penicillium* and to lose its ability to germinate after the level of soil moisture was raised.

In the first part of the present investigation, it was found that seed treatment tended to preserve seed sown in dry soil. For instance, where untreated seed of fractured durum wheat after exposure to dry soil for nine days germinated 19.5%, seed treated with Ceresan M germinated 64.0%. For other treatments the germination was: Half-ounce Leytosan, 55.0%; four-hour soak in cool water, 54.0%; formaldehyde, 37.0%; hot-water treatment, 26.0%. When sown directly in moist soil, untreated seed and seed treated with Ceresan M, Half-ounce Leytosan, or cool water, germinated 95.0%, but seed treated with formaldehyde germinated 90.5% while that treated with hot water germinated 56.5%.

In the second part a study was made of a number of samples each of Thatcher wheat, Victory oats, and Montcalm barley, representing stocks of Foundation or Elite seed produced in 1949. It was found that treatment of these samples before sowing in "dry" soil increased germination after the soil was moistened, of wheat by 12.5%, of oats by 5.4%, and of barley by 9.0%. When the treated seed was sown directly in moist soil, the increase in germination was negligible.

PRELIMINARY MICROBIOLOGICAL INVESTIGATIONS ON THE PEACH REPLANTING PROBLEM.

R. N. Wensley, Plant Pathology Laboratory, Harrow, Ontario.

A peach replanting problem, not unlike that reported elsewhere in U.S.A. has become of prime economic importance in southwestern Ontario and its investigation is now under conduct at the Harrow Science Service Laboratory. The explanation for peach tree failure when planted in old orchard areas, more particularly in former tree sites, is currently being sought in several ways, including microbiological investigations instituted in late summer 1952.

A survey of the rhizosphere fungus flora was made of five orchard areas, including two nurseries, one commercial orchard, a Science Service Elberta orchard, and an area previously planted to sour cherry. The condition under investigation has so far proved to be absent following sour cherry.

Population patterns have been found in each orchard and when expressed in terms of percentage concentration of each type appearing, differences have become manifested. Compared with the high concentration of *Penicillium* (42%) and *Fusarium* (51%) species in the orchard area after sour cherry, *Aspergillus* (47%) along with *Paecilomyces* (17%), *Penicillium* (11%) and *Gliocladium* species predominated in Science Service Elberta, *Gliocladium* (36%), *Penicillium, Trichoderma, Fusarium,* and *Cladosporium* predominated in Prudhomme Nursery, while *Penicillium* (36%), *Fusarium, Hormodendron, Monosporium* and *Torula* species were most important in the commercial orchard.

Microscopical examination of root tissue obtained from ten orchards where the problem exists revealed the consistent presence of a phycomycetous mycorrhizal fungus that was uninhibited by ethylene dibromide soil fumigation.

LIST OF PAPERS PUBLISHED BY MEMBERS OF THE CANADIAN PHYTOPATHOLOGICAL SOCIETY

Between June 1, 1951, and May 31, 1953.

(In addition to abstracts published in Proc. Can. Phytopath. Soc. No. 19, 1951, and No. 20, 1952.)

1. ATKINSON, R. G. A new species of *Heterosporium* from soil. Mycologia 44: 813-822. 1952.
2. AYERS, G. W. Studies on Verticillium wilt of potatoes. Amer. Pot. Jour. 29: 201-205. 1952.
3. ————, and Robinson, D. B. Verticillium wilt of potatoes and its control. Can. Dept. Agr. Publ. 888. 1953.
4. ———— (See also 153).
5. BERKELEY, G. H. Virus diseases of Gladiolus. Gladiolus Annual. 1952.
6. ———— Some viruses affecting Gladiolus. Phytopath. 43: 111-115. 1953.
7. ———— Progress report potato scab committee. Proc. Ont. Soil & Crop Improv. Assoc. 1953: 103-106. 1953.
8. ———— and WEINTRAUB, M. Turnip mosaic. Phytopath. 42: 258-260. 1952.
9. BOIVIN, B. Review on "Handbook of North Dakota Plants". Can. Field-Nat. 65: 188. 1951.
10. ———— *Pugillus potentillarum.* Phytologia 4: 89-93. 1952.
11. ———— The distribution of *Arnica wilsonii* and its significance. Rhodora 54: 200-205. 1952.
12. ———— Two variations of *Pteridium aquilinum.* Amer. Fern. Jour. 42: 131-133. 1952.
13. ———— Review of "A new flora of the Lake Erie Islands". Can. Field-Nat. 66: 115. 1952.
14. ———— Quelques *Veronica* du Canada. Nat. Can. 23: 173-176. 1952.
15. ———— Subordination des variations du *Castilleja pallida* (Linne) Sprengel. Nat. Can. 23: 320-321. 1952.
16. ———— Les décharges du glacier continental à travers la prairie canadienne. Rev. Can. Géographie 7: 23-25. 1953.
17. ———— Le groupe du *Stellaria longifolia* Muhlenberg (Caryophyllaceae). Svensk. Bot. Tidskrift 47: 43-46. 1953.
18. ———— Quelques *Antennaria* canadiens. Nat. Can. 80: 120-124. 1953.
19. ———— Animadversions and other notes on *Arnica.* Rhodora 55: 55-57. 1953.
20. ———— Two new variations in *Trillium.* Rhodora 55: 101-102. 1953.
21. BOSHER, J. E. Potato rot caused by the iris bulb nematode *Ditylenchus destructor* in British Columbia. Pl. Dis. Reptr. 37: 201-202. 1953.
22. ———— The discovery of nematodes belonging to the genus *Heterodera* in British Columbia, and their relationships. Sci. Agr. 32: 507-510. 1952. (Hastings, R. J. and Bosher, J. E.).
23. ———— The revival of the Narcissus Bulb eelworm *Didylenchus dipsaci* (Kuhn) Filipjev, from sublethal hot water treatments. Sci. Agr. 32: 333-336. 1952. (Hastings, R. J., Bosher, J. E., and Newton, W.).
24. ———— Experimental transfers of the bulb nematode of iris, of narcissus, of hyacinth, to potato. Sci. Agr. 32: 304-310. 1952. (Hastings, R. J., Bosher, J. E., and Newton, W.).
25. ———— (See also 57).
26. BROWN, A. M. Cotoneaster as a host of *Gymnosporangium claviceps* in Manitoba. Mycologia 44: 719-720. 1952.

27. BROWN, A. M. (See also 84 and 85).

28. CALLBECK, L. C. Recent advances in late blight control. Maritime Agriculture 1: 42-44. 1951.

29. ———— Fungicides Protect Potatoes. Agr. Inst. Review 8(2): 28-30. 1953.

30. CHAMBERLAIN, G. C. The use of fungicides on stone fruits. Agr. Inst. Rev. 8(2): 34-35. 1953.

31. ———— Diseases and insect pests of the raspberry in Canada. Can. Dept. Agr. Publ. 880. 1952. (Chamberlain, G. C., and Putnam, W. L.).

32. CHEREWICK, W. J. Studies on dwarf leaf rust of barley. U.S.D.A. Tech. Bull. 1056. 1952. (Levine, N. M. and Cherewick, W. J.).

33. ———— and POPP, W. Smuts of coarse grains in Manitoba. Sci. Agr. 31: 496-504. 1951.

34. CINQ-MARS, L. Comment on lutte contre la tavelure du pommier. Agric. 9: 424-430. 1952.

35. ———— Effect of certain fungicides on the growth and yield of apple trees. Pom. and Fruit Grow. Soc. Que. Ann. Report 1951: 44-53. 1952.

36. ———— Les maladies du verger. *In* manuel de pulvérisation du verger. Que. Dept. Agr. pp. 5-13. 1952. (Processed).

37. ———— Fongicides. *In* manuel de pulvérisation du verger. Que. Dept. Agr. pp. 30-34. 1952. (Processed).

38. ———— Pulvérisations concentrées. *In* manuel de pulvérisation du verger. Que. Dept. Agr. pp. 53-58. 1952. (Processed).

39. ———— and COULSON, J. G. Effects of fungicides on crop plants. Agr. Inst. Rev. 8(2): 54-56, 61. 1953.

40. CONNERS, I. L. List of fungicides and fungicide-insecticides registered for 1951 as of July 31, 1951. Can. Dept. Agr. 1951. (Processed).

41. ———— List of fungicides and fungicide-insecticides registered for 1952 as of July 15, 1952. Can. Dept. Agr. 1952. (Processed).

42. ———— Stem rust in western Canada; and dwarf bunt found in Ontario. F.A.O. Pl. Prot. Bull. 1: 43. 1952.

43. ———— Virus diseases of cereals in Canada. F.A.O. Pl. Prot. Bull. 1: 72-73. 1953.

44. ———— and SAVILE, D. B. O. Canadian Plant Disease Survey, 1950, Annual Report 30: 1-135. 1952. (Processed).

45. ———— ———— Canadian Plant Disease Survey, 1951. Annual Report 31: 1-122. 1952. (Processed)

46. CORMACK, M. W. Winter crown rot or snow mould of alfalfa, clovers, and grasses in Alberta. II. Field studies on host and varietal resistance and other factors related to control. Can. Jour. Bot. 30: 537-548. 1952.

47. ———— (See also 71).

48. COULSON,J. G. (See 39).

49. DAVIDSON, T. R. (See 171).

50. DRAYTON, F. L., and GROVES, J. W. *Stromatinia narcissi,* a new sexually dimorphic discomycete. Mycologia 44: 119-140. 1952.

51. FOSTER, R. E. Studies in forest pathology. VIII. Decay of western hemlock on the Queen Charlotte Islands. British Columbia. Can. Jour. Bot. 29: 479-521. 1951. (Foster, R. E., and Foster, A. T.).

52. ———— Estimating decay in western hemlock. Suggested aids to the inventory in the Queen Charlotte Islands. B.C. Lumberman 36(11): 1952. (Foster, R. E., and Foster, A. T.).

53. FOSTER, R. E. Estimating decay in western hemlock. II. Suggested aids to utilization in the Queen Charlotte Islands. B.C. Lumberman 37(4): 1953. (Foster, R. E., and Foster, A. T.).

54. FOSTER, W. R. Tomato mosaic and streak. Horticultural Circ. 19: 1-3. 1953.

55. ————Moss in lawns. Horticultural Circ. 20: 1-2. 1953.

56. ———— Diseases. *In* strawberry culture. Horticultural Circ. 58: 48-52. 1953.

57. ———— and BOSHER, J. E. The diseases of narcissus, tulip, iris, and hyacinths and their control. Bulb Production Series No. 2: 1-14. 1953.

58. GÉNÉREUX, H. Les maladies de la pomme de terre. Agric. 9: 392-401. 1952.

59. GILPATRICK, J. D., and WEINTRAUB, M. An unusual type of protection with the carnation mosaic virus. Science 115: 701-702. 1952.

60. ———— (See also 199 and 200).

61. GORDON, W. L. The occurrence of *Fusarium* species in Canada. II. Prevalence and taxonomy of *Fusarium* species in cereal seed. Can. Jour. Bot. 30: 209-251. 1952.

62. GREEN, G. J. (See 82, 84, and 85).

63. GROVES, J. W. A *Derma* on *Prunus* in China. Mycologia 43: 719-722. 1951.

64. ———— Mushroom collecting from beginners. Dept. Agr. Publ. 861. 1951.

65. ———— The genus *Tympanis*. Can. Jour. Bot. 30: 571-651. 1952.

66. ———— and LOVELAND, C. A. The connection between *Botrytinia fuckeliana* and *Botrytis cinerea*. Mycologia 45: 415-425. 1953.

67. ———— (See also 50).

68. HAGBORG, W. A. F. A possible virus disease of cereals. Proc. Ann. Conf. Man. Agron. 1951: 15-16. 1951.

69. ———— A new bacterial disease of barley. Proc. Ann. Conf. Man. Agron. 1952. 20-21. 1952.

70. HANNA, W. F. (See 83).

71. HAWN, E. J., and CORMACK, M. W. Crown bud rot of alfalfa. Ptytopath 42: 510-511. 1952.

72. HILDEBRAND, A. A. Observations on spread in the soil of *Cephalosporium gregatum*. Allington and Chamberlain, the cause of brown stem rot of soybeans. Pl. Dis. Reptr. 36: 106-107. 1952.

73. ———— Stem canker — a disease of increasing importance on soybeans in Ontario. The Soybean Digest 12: 12-15. 1952.

74. ——— and KOCH, L. W. Observations on a root and stem rot of soybeans new to Ontario caused by *Pythium ultimum* Trow. Sci. Agr. 32: 574-580. 1952.

75. ———— ———— A study of systemic infection by downy mildew of soybean with special reference to symptomatology, economic significance, and control. Sci. Agr. 31: 505-518. 1951.

76. ———— (See also 97).

77. HOCKEY, J. F. Further results from eradicant fungicides. N.S. Fruit Growers Assoc. Rept. 88: 138-141. 1951.

78. ———— Orchard fungicides in Nova Scotia. Maritime Agr. 1: 74-87. 1951.

79. ———— Grey mould wilt of raspberry. Sci. Agr. 32: 150-152. 1952.

80. ———— Studies in fruit diseases. IX. Apple scab. Can. Dept. Agr. Publication 519. 1953.

81. ——— Safeguarding Canada's apple crop. Agr. Inst. Review 8(2): 39-40. 1953.

82. JOHNSON, T., and GREEN, G. J. Overwintering of urediospores of rye stem rust in Manitoba. Phytopath. 42: 403-404. 1952.

83. JOHNSON, T., and HANNA, W. F. Variability in microorganisms in relation to disease control. *In* Agricultural Research in Canada. Agr. Inst. Can., Ottawa. pp. 9-17. 1952.

84. ——— PETURSON, B., BROWN, A. M.,and GREEN, G. J. *Physiological* races of cereal rusts in Canada in 1952. Can. Dept. Agr., Lab. Pl. Path., Winnipeg, Rept. 4. 1953. (Mimeographed).

85. ———, ———, ———, ——— Report on rust nurseries in Canada in 1952. Can. Dept. Agr., Lab. Pl. Path., Winnipeg, Rept. 3. 1952. (Mimeographed).

86. JONES, W. Summary of observations of the late blight resistant varieties Canso and Keswick grown at Comox during the 1950 season. Rept. B.C. Agron. Assoc. Conf. Jan. 1951.

87. ——— Infection of basal shoots of hop by *Rhizoctonia solani.* Sci. Agr. 32: 114-115. 1952.

88. ——— An unreported *Phytophthora* rot of Swede turnips. Phytopath. 42: 515. 1952.

89. ——— Check list of disease and forage crops in the coastal area of British Columbia. B.C. Agron. Assoc. Conf. Jan. 1953. (Mimeographed).

90. ——— and ORCHARD, W. R. Check list of fungus and bacterial organisms causing diseases of ornamental plants in B.C. coast areas. H.E.P.P. Conf. June 1951. (Mimeographed).

91. JULIEN, J. B. (See 144).

92. KATZNELSON, H., and SUTTON, M. D. Inhibition of plant pathogenic bacteria *in vitro* by antibiotics and quarternary ammonium compounds. Can. Jour. Bot. 29: 270-278. 1951.

93. ———, ——— A rapid phage count method for the detection of bacteria as applied to the demonstration of internally borne bacterial infection of seed. Jour. Bact. 61: 689-701. 1951.

94. ——— (See also 190).

95. KOCH, L. W. Blackroot of sugarbeets. *In* Agricultural Research in Canada. Agr. Inst. Canada, Ottawa, pp. 95-101. 1952.

96. ——— Fungicides fight root rots. Agr. Inst. Rev. 8(2): 31-32. 1953.

97. ——— and HILDEBRAND, A. A. An occurrence of a gummosis of sugar beets in Ontario in 1951. Pl. Dis. Reptr. 26: 196-197. 1952.

98. ——— (See also 74, 75, 188, and 189).

99. LACHANCE, R. O. Les méthodes modernes de désinfection des céréales. Agric. 8: 165-170. 1951.

100. ——— Antagonisme des microorganismes du sol envers le *Colletotrichum linicola* agent de l'anthracnose. Can. Jour. Bot. 29: 438-449. 1951.

101. ——— Maladies physiogéniques. Agric. 9: 347-355. 1952.

102. ——— Les maladies des plantes fourragères. Agric. 9: 367-371. 1952.

103. LEDINGHAM, R. J. Growth cracks in wheat seed. Can. Jour. Agr. Sci. 33: 198-199. 1953.

104. LOPATECKI, L. E., and NEWTON, W. The decomposition of dithiocarbamate fungicides with special reference to the volatile products. Can. Jour. Bot. 30: 131-138. 1952.

105. LOTT, T. B. (See 202).

106. LOVELAND, C. A. (See 66).

107. MACHACEK, J. E. Tests of newer seed treatments — 1951. Pl. Dis. Reptr 36: 178-179. 1952.

108. ——— Cooperative seed-treatment trials — 1952. Pl. Dis. Reptr. 37: 59-62. 1953.

109. MACHACEK, J. E. Seed treatment of cereals and flax. Agr. Inst. Rev. 8(2): 25-27. 1953.

110. ———— and WALLACE, H. A. H. Germination of treated and untreated seed of wheat, oats, and barley of different commercial grades. Sci. Agr. 32: 597-602. 1952.

111. ———— ———— Longevity of some common fungi in cereal seed. Can. Jour. Bot. 30: 164-169. 1952.

112. MacLACHLAN, D. S. Strain interrelationships in potato virus A. Wis. Agr. Exp. Sta. Res. Bull. 180. 1953. (MacLachlan, D. S., Larson, R. H., and Walker, J. C.).

113. ———— Fumigation of used bags with toxic gases for the control of bacterial ring rot of potato. Can. Jour. Agr. Sci. 33: 132-140. 1953. (MacLachlan, D. S., Munro, H. A. U., Racicot, H. N., and King, J. E.).

114. ———— (See also 151).

115. McINTOSH, D. L. Sulphurs still best in checking apple mildew. Country Life in B.C. 37: 10. 1953. (McIntosh, D. L., and Morgan, C. U. G.).

116. ———— Apple scab, a real threat. Country Life in B.C. 37: 11, 23. 1953.

117. ———— Fire blight. Country Life in B.C. 37: 14, 15. 1953.

118. McKEEN, C. D. Investigations of Fusarium wilt of muskmelon and watermelon in southwestern Ontario. Sci. Agr. 31. 413-423. 1951.

119. ———— An occurrence of rot of Spanish onion seedlings caused by *Botrytis allii*. Sci. Agr. 31: 541-545. 1951.

120. ———— Observations on the occurrence and control of grey mould on greenhouse cucumbers. Sci. Agr. 32: 670-676. 1952.

121. ———— *Aphanomyces cladogamus* Drech., a cause of damping off in peppers and certain other vegetables. Can. Jour. Bot. 30: 701-709. 1952.

122. ———— Greenhouse crops. How insecticides and fungicides keep them healthy. Agr. Inst. Rev. 8(2): 36-39. 1953. (Boyce, H. R., and McKeen, C. D.).

123. McKEEN, W. E. An exceptionally early outbreak of corn rust in Canada. Pl. Dis. Reptr. 35: 367. 1951.

124. ———— Seedling susceptibility of dent corn inbreds to rootrot caused by *Pythium arrhenomanes*. Sci. Agr. 31: 475-480. 1951.

125. ———— *Phialophora radicicola* Cain, a corn rootrot pathogen. Can. Jour. Bot. 30: 344-347. 1952.

126. ————A hitherto unreported corn disease. Pl. Dis. Reptr. 36:: 143. 1952.

127. McKEEN, W. E. A seed-borne disease of corn. Pl. Dis. Reptr. 36: 145. 1952.

128. ————Preliminary studies of root and basal stalk rot of maturing corn in Ontario. Can. Jour. Bot. 31: 132-141. 1953.

129. McLARTY, H. R. Manganese deficiency in peach and apple in British Columbia. Sci. Agr. 31: 435-438. 1951. (Woodbridge, C. G., and McLarty, H. R.).

130. ———— A certification scheme for tree fruit nursery stock in British Columbia. Country Life in B.C. 36: 11. 1952. (Palmer, R. C., and McLarty, H. R.).

131. ———— A boron deficiency in pear growing in soil having an adequate boron content. Sci. Agr. 32: 440-442. 1952. (Woodbridge, C. G., Carney, A., and McLarty, H. R.).

132. ———— Further observations and investigations on manganese deficiency in fruit trees in British Columbia. Can. Jour. Agr. Sci. 33: 153-158. 1953. (Woodbridge, C. G., and McLarty, H. R.).

133. MILLER, J. J. A note on some preliminary observations on the effect of the antibiotic terramycin on insect symbiotic microorganisms. Can. Entomologist. 83: 343-345. 1951. (Musgrave, A. J., and Miller, J. J.).

134. ———— Detection of radio-phosphorus in cells and spores of fungi by radioautography. Nature 170: 239. 1952. (Adams, A. M., and Miller, J. J.).

135. MILLER, J. J. The effect of certain chemicals on ascospre formation in *Saccharomyces cerevisiae*. Revue Canadienne de Biologie 11: 520. 1953. (Miller, J. J., and Hellman, J. E.).

136. NEWTON, W. Effects of the applications of fungicides to the wounded plant tissues. Sci. Agr. 32: 659-662. 1952.

137. ———— (See also 23, 24, and 104).

138. ORCHARD, W. R. (See 90).

139. PAYETTE, A. Parasitisme et maladies des plantes. Agric. 9: 325-329. 1952.

140. PETURSON, B. Effect of growth-promoting substances on the germination of urediospores of crown rust. Phytopath. 41: 1039-1040. 1951.

141. ———— (See also 84, and 85).

142. POPP, W. (See 33, and 156).

143. RACICOT, H. N. Tomato breeding for resistance to *Phytophthora infestans* (Mont.) de By. I. Method of innoculation and preliminary results. Sci. Agr. 32: 57-66. 1952. (Ferguson, W., Lyall, L. H., and Racicot, H. N.).

144. ———— and JULIEN, J. B. Maladies des petits fruits. Agric. 9: 380-386. 1952.

145. ———— (See also 113, and 152).

146. RICHARDSON, J. K. A simple nephelometer. Phytopath. 42: 171. 1952.

147. ———— The influence of tuber development on scab infection in Katahdin potatoes. Phytopath. 42: 297-298. 1952.

148. RICHARDSON, L. T. Potato blight control increases production. So. Dak. Farm and Home Research 2: 61-65. 1951. (Richardson, L. T., and Nagel, C.M.).

149. ———— Fungicides for potato blight control. So. Dak. Agr. Exp. Sta. Circ. 89. 1951. (Nagel, C. M., and Richardson, L. T.).

150. ———— Tomato leaf spot control. So. Dak. Agr. Exp. Sta. Circ. 9. 1951. (Nagel, C. M., and Richardson, L. T.).

151. ———— and MacLACHLAN, D. S. The control of downy mildew of hops in eastern Ontario. Sci. Agr. 31: 345-348. 1951.

152. ———— and RACICOT, H. N. The comparative efficiency of tuber indexing and tuber unit planting in the elimination of virus diseases from seed potatoes. Amer. Potato Jour. 28: 765-775. 1951.

153. ROBINSON, D. B., and AYERS, G. W. The control of Verticillium wilt of potatoes by seed treatment. Can. Jour. Agr. Sci. 33: 147-152. 1953.

154. ———— (See also 3).

155. RUSSELL, R. C. The diseases of barley and their control. Agr. Inst. Rev. 7(2): 35-36. 1952.

156. ————, and POPP, W. The embryo test as a method of forecasting loose smut infection in barley. Sci. Agr. 31: 559-565. 1951.

157. ———— (See also 193).

158. SACKSTON, W. E. Effect of pasmo disease of flax on the yield and quality of linseed oil. Can. Jour. Bot. 29: 339-351. 1951. (Sackston, W. E., and Carson, R. B.).

159. ———— Sunflower diseases in Manitoba in 1951. Proc. Ann. Conf. Man. Agron. 16: 1951. (Abstract).

160. ———— Flax diseases, flax varieties, and cultural practices. Proc. Flax Inst. U.S.A. 1951: 3 pp. 1951.

161. ———— Flax diseases in Manitoba in 1950. Can. Pl. Dis. Surv. 30: 36-37. 1951.

162. ———— Sunflower diseases in Manitoba in 1950. Can. Pl. Dis. Surv. 30: 43-44. 1951.

163. ———— Flax diseases in Manitoba in 1951. Can. Pl. Dis. Surv. 31: 29-31. 1952.

164. SACKSTON, W. E. Sunflower diseases in Manitoba in 1951. Can. Pl. Dis. Surv. 31: 36-39. 1952.

165. ———— Diseases of oil seed crops in Manitoba. Proc. Can. Barley and Oil Seeds Conf. 60-61. 1952.

166. ———— Plant diseases. *In* Small grains for profit. Man. Dept. Agr. and Immigr. Publ. 251: 17-23. 1952.

167. ———— Diseases of oil seed crops in Manitoba in 1952. Ann. Conf. Man. Agron. 1952: 21-22. 1952.

168. SANFORD, G. B. Effect of various chemicals on the natural healing of freshly cut potato sets. Phytopath. 41: 1077-1082. 1951.

169. ———— Phloem necrosis of potato tubers associated with infestation of vines by *Paratrioza cockerelli* Sulc. Sci. Agr. 32: 433-439. 1952.

170. ———— Persistense of *Rhizoctonia solani* Kühn in soil. Can. Jour. Bot. 30: 652-664. 1952.

171. ————, and DAVIDSON, T. R. Effect of 2, 4-Dichlorophenoxiacetic acid vapour on tomato plants in a greenhouse. Sci. Agr. 31: 368-371. 1951.

172. SAVILE, D. B. O. The ring-billed gull at Ottawa, Ontario, and its field recognition. Can. Field-Nat. 65: 109-112. 1951.

173. ———— Review: Tidewater to timberline by Dan McCowan. Can. Field-Nat. 65: 126. 1951.

174. ———— Bird observations at Chesterfield Inlet, Keewatin, in 1950. Can. Field-Nat. 65: 145-157. 1951.

175. ———— Notes on the flora of Chesterfield Inlet, Keewatin District, N.W.T. Can. Field-Nat. 66: 103-107. 1952. (Savile, D. B. O., and Calder, J. A.).

176. ————A study of the species of *Cintractia* on *Carex*. Can. Jour. Bot. 30: 410-435. 1952.

177. ———— Short-season adaptations in the rust fungi. Mycologia 45: 75-87. 1953.

178. ———— Phylogeny of *Carex* in the light of parasitism by the smut fungi. Can. Jour. Bot. 31: 164-174. 1953. (Savile, D. B. O., and Calder, J. A.).

179. ———— Splash-cup dispersal-mechanism in *Chrysosplenium* and *Mitella*. Science 117 (3036): 250-251. 1953.

180. ———— (See also 44, and 45).

181. SHOEMAKER, R. A. Differential staining of fungus and host cells using a modification of Pianeze III B. Stain Technology 27: 121. 1952. (Simmons, S. A., and Shoemaker, R. A.).

182. SIMMONDS, P. M. Rootrots of cereals. II. Bot. Rev. 19: 131-146. 1953.

183. SKOLKO, A. J. (See 196, and 197).

184. SKOROPAD, W. P. Inheritance of resistance to *Ustilago nuda* in barley. Can. Jour. Bot. 30: 525-536. 1952.

185. SLYKHUIS, J. T. Investigations on sweet clover failure in southwestern Ontario. Sci. Agr. 32: 1-18. 1952.

186. ———— Wheat streak mosaic in Alberta and factors related to its spread. Can. Jour. Agr. Sci. 33: 195-197. 1953.

187. ———— Wheat streak mosaic in Alberta and its control. Can. Dept. Agr. 1953. (Mimeographed). (Slykhuis, J. T., and Andrews, J. E.).

188. STOVER, R. H., and KOCH, L. W. The epidemiology of blue mold of tobacco and its relation to the incidence of the disease in Ontario. Sci. Agr. 31: 225-252. 1951.

189. ———— ———— Methyl bromide as a soil fumigant for controlling diseases and weeds in tobacco seedbeds. Sci. Agr. 32: 4411-420. 1952.

190. SUTTON, M. D., and KATZNELSON, H. Isolation of bacteriophages for the detection and identification of some seed-borne pathogenic bacteria. Can. Jour. Bot. 31: 201-205. 1953.

191. ———— (See 92, and 93).

192. TINLINE, R. D. Studies on the perfect stage of *Helminthosporium sativum*. Can. Jour. Bot. 29: 467-478. 1951.

193. TYNER, L. E., and RUSSELL, R. C. Control of loose smut in barley by tetrachloro-para-benzoquinone (Spergon-SL). Pl. Dis. Reptr. 36: 180-181. 1952.

194. VANTERPOOL, T. C. The phenomenal decline of browning root rot (*Pythium* spp.) on the Canadian prairies. Sci, Agr. 32: 443-452. 1952.

195. ———— Flax diseases in Saskatchewan in 1950. Can. Pl. Dis. Surv. 30: 34-35. 1952.

196. ———— Flax diseases in Saskatchewan in 1951. Can. Pl. Dis. Surv. 31: 27-29. 1952.

197. ———— The problem of ergot in feed and seed. Univ. of Sask. Agr. Ext. Bull. 108: 3 pp. 1952. (Bell, J. M., and Vanterpool, T. C.).

198. ———— The Canadian Tuckahoe. The Blue Jay, April-June. 1952.

199. WALLACE, H. A.H. Germination of injured and diseased cereal seed. Addresses and Proceedings Sask. Agr. Coll. Grad. Assoc., Can. Seed Gr. Assoc., and Sask. Field Husb. Assoc., pp. 26-30. 1952.

200. ———— (See also 110 and 111).

201. WALLEN, V. R., and SKOLKO, A. J. Activity of antibiotics against *Ascochyta pisi*. Can. Jour. Bot. 29 : 316-323. 1951.

202. ———— Treatment of vegetable seed of low germination. Pl. Dis. Reptr. 37 : 66-68. 1953.

203. WEINTRAUB, M. Leaf movements in *Mimosa pudica* L. New Phytologist 50: 357-382. 1952.

204. ———— and GILPATRICK, J.D. An inhibitor in a new host of tobacco ring spot virus. Can. Jour. Bot. 30: 549-557. 1952.

205. ————, ———— and WILLISON, R. S. The effect of certain water-soluble compounds on virus infection. Phytopath. 42: 417-419. 1952.

206. ———— (See also 8, 59, and 210).

207. WELSH, M. F. and LOTT, T. B. Testing to ensure disease freedom in tree fruit nursery stock. Country Life in B.C. 36: 11, 15. 1952.

208. WENSLEY, R.N. Microbiological studies on the action of some selected soil fumigants. Can. Jour. Bot. 31: 277-308. 1953.

209. WILLISON, R. S. The effects of some stone fruit viruses on cucumber. Pl. Dis. Reptr. 35: 254-255. 1951.

210. ———— and WEINTRAUB, M. Studies on stone-fruit viruses in cucurbit hosts. I. A method of evaluating the infectivity of infectious juice. Phytopath. 43: 175-177. 1953.

211. ————(See also 200).

212. WRIGHT, N. S. Studies on the Witches' Broom virus disease of potatoes in British Columbia. Can. Jour. Bot. 30: 735-743. 1952.

213. YARWOOD, C. E. Hop cankers. Pl. Dis. Reportr. 35: 361-363. 1951.

214. ———— Temperatures of diseased leaves. Phytopath. 41: 945. 1951. (Abstract).

215. ———— Associations of rust and virus infections. Science 114: 127-128. 1951.

216. ———— Fungicides for powdery mildews. Proc. 2nd Int. Cong. for Crop Prot. 2: 500-521. 1951.

217. ———— Guttation due to leaf pressure favors fungus infections. Phytopath. 42: 520. 1952. (Abstract).

218. YARWOOD, C. E. Latent period and generation time of tobacco mosaic virus. Phytopath. 42: 520. 1952. (Abstract).

219. ———— Latent period and generation time for two plant viruses. Am. Jour. Bot. 39: 613-618. 1952.

220. ———— Reduction of cherry decay by washing. Pl. Dis. Reporter 36: 389. 1952. (Yarwood, C. E., and Harvey, H. T.).

221. ———— Nutritive value of rust-infected bean leaves. Phytopath. 42: 481. 1952. (Yarwood, C. E., Hall, A., and Nelson, M.).

222. ———— Fungicidal action due to selective toxicity and selective absorption. Phytopath. 42: 478. 1952. (Yarwood, C. E., and Jacobson, L.).

223. ———— Some water relations of *Erysiphe polygoni* conidia. Mycologia 44: 506-522. 1952.

224. ———— Temperature response of fungi as a straight line transformation. Plant Physiology 27: 634-638. 1952. (Cohen, Morris, and Yarwood, C. E.).

225. ———— Deleterious action of water in plant virus inoculations. Nature 169: 502. 1952.

226. ———— Apricot powdery mildew from rose and peach. Cal. Dept. Agr. Bull. 41: 19-25. 1952.

227. ———— Some relations of carbohydrate level of the host to plant virus infections. Am. Jour. Bot. 39: 119-124. 1952.

228. ———— Pressure effects in fungus and virus infections. Phytopath. 43: 70-72. 1953.

229. ———— Reduction of smog injury by rust infection. Pl. Dis. Reporter 37: 121. 1953.

230. ———— Nutritive value of rust-infected leaves. Science 117: 326-327. 1953. (Yarwood, C. E., Hall, A., and Nelson, M.M.).

FRITZ, CLARA W. Brown stain in pine sapwood caused by *Cytospora* sp. Can. Jour. Bot. 30: 349-359. 1952.

———— Brown stain and its effect on the strength of pine poles. Forestry Chronicle 28: 3-8. 1952.

———— Decay and stains in wood. Reprint of Chapter 6 in "Canadian woods, their properties and uses." Ottawa, 1952.